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| EXAMINER | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/562,211 | BIJVOET ET AL. | |
| | Examiner | Art Unit | |
| | Brooke Purinton | 2881 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12/23/2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/19/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

### *Claim Objections*

Claim 24 is objected to because of the following informalities: second to last line: "least one second being dynamic" should be "least one second force being dynamic". Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 10-12, 14, 15, 24-31, 33-35 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeshi Sato (JP 11040657A, and machine translation) in view of Lemelson (5119205).

**Regarding Claim 1**, Sato teaches a lithographic apparatus (Figure 1) comprising:

an illumination system configured to condition a radiation beam (Figure 1, part 2);

a support constructed to support a patterning device (Figure 1, part 4 supports part 3), the patterning device being constructed and arranged to impart the radiation beam with a pattern in its cross-section to form a patterned radiation beam ("reticle" abstract), wherein the support is arranged to subject, at least when the support is accelerated, a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is counteracted by frictional forces occurring at a contact area between the patterning device and the support (Figure 2b, vacuum part 30a,32a), wherein the support is associated with a clamping device which is arranged to subject a second side of the patterning device to at least one second force, at least when the support is accelerated (Figure 2b, clampers 60,63,64), and to dynamically vary the at least one second force depending on a magnitude of motion of the patterning device (machine translation, paragraph 14).

Sato fails to explicitly teach wherein the clamping device is arranged to clamp in an automatic fashion.

Lemelson teaches wherein a clamping device for a mask is arranged to automatically subject a side of the mask to at least one force (53, 20-25).

Modification would have entailed using the same basic principles of Lemelson to automate the apparatus of Sato in a similar fashion, using the control system (8) of Sato to do the automatic adjustments.

It would have been obvious to make such a modification it would have allowed more flexibility in the mask clamping process to be able to either proceed manually (if the operator had a certain goal) or automatically (when efficiency and precision that can be achieved with machine automation is needed).

**Regarding Claim 24**, Sato et al. teach a device manufacturing method comprising: transferring a pattern from a patterning device onto a substrate wherein the method comprises supporting the patterning device using a support (Figure 1, parts 3/4); accelerating the support (Figure 1, part 3, direction RR); subjecting a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is suppressed by frictional forces occurring at a contact area between the patterning device and the support (Figure 2, pressurizing device, 70a-70c); and subjecting a second side of the patterning device to at least one second force normal to the direction of the acceleration of the support, at least when the support is accelerated (Figure 2, clamper 63), the at least one second force being dynamic depending on a magnitude of motion (Sato, par 14).

Sato fails to explicitly teach varying the second force in an automatic fashion (although it is likely that Sato in fact does do this procedure using the control system 8 of the apparatus, since in at least one embodiment, that of an electron beam, the need for a vacuum pumped apparatus means that manual adjustment would be unfeasible during operation).

Lemelson teaches wherein a clamping device for a mask is arranged to automatically subject a side of the mask to at least one force (53, 20-25).

Modification would have entailed using the same basic principles of Lemelson to automate the apparatus of Sato in a similar fashion, using the control system (8) of Sato to do the automatic adjustments.

It would have been obvious to make such a modification it would have allowed more flexibility in the mask clamping process to be able to either proceed manually (if the operator had a certain goal) or automatically (when efficiency and precision that can be achieved with machine automation is needed).

**Regarding Claim 28**, Sato and Lemelson teach a method according to claim 24, Sato further teaches wherein the method comprises exerting the at least one force actively (Figure 3a/b, 66 motor means are actively providing force).

**Regarding Claim 29**, Sato and Lemelson teach a method according to claim 24, Sato further teaches wherein the method comprises exerting the at least one force passively (Figure 4, part 72).

**Regarding Claims 2 and 25**, Sato and Lemelson teach a lithographic apparatus/method according to claim 1/24, Sato further teaches wherein the first and second side of the patterning device are situated substantially opposite each other (see Figure 2).

**Regarding Claims 3 and 26**, Sato and Lemelson teach a lithographic apparatus/method according to claim 1/24, Sato further teaches wherein the clamping device is arranged to provide the at least one second force substantially coinciding with the at least one first force (Figure 2a/b).

**Regarding Claims 4 and 27**, Sato and Lemelson teach a lithographic apparatus/method according to claim 1/24, Sato further teaches wherein the clamping device is arranged to provide the at least one second force while minimizing areas of contact of which frictional forces can act between the clamping device and the patterning device when the patterning device is accelerated with respect to the clamping device (see part 63 of Figure 3a, where the pole piece touching the substrate with the least amount of contact area).

**Regarding Claim 5**, Sato and Lemelson teach a lithographic apparatus according to claim 1, wherein the clamping devices arranged to exert the at least one second force actively (Figure 3a, motor 66 actively puts clamping force on patterning device).

**Regarding Claim 6**, Sato and Lemelson teach a lithographic apparatus according to claim 1, Sato further teaches wherein the clamping device is arranged to exert the at least one second force passively (Figure 4, spring 72, passively puts clamping force on patterning device, also see paragraph [0014]).

**Regarding Claim 30**, Sato and Lemelson teach a lithographic apparatus according to claim 24, Sato further teaches wherein the clamping device is movable (Figure 3a).

**Regarding Claims 10 and 33**, Sato and Lemelson teach a lithographic apparatus/method according to claim 1/24, Sato further teaches wherein the clamping device is connected to the support (Figure 3a).

**Regarding Claims 11 and 34**, Sato and Lemelson teach an apparatus according to claim 10/33. Sato further teaches wherein the clamping device is arranged to dynamically exert the at least one second force when the support is being accelerated (Paragraph 14).

Claims 12, 14, 15, 35, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato and Lemelson as applied to claims 1 and 24 above, and further in view of Araki et al. (20030197841).

**Regarding Claims 12 and 35**, Sato and Ataki et al. teach a lithographic apparatus/method according to claim 11/34.

Sato teaches wherein a clamping device for a mask is arranged to dynamically subject a side of the mask to at least one force ([14]).

Sato fails to explicitly state wherein the clamping device comprises at least one configured to dynamically exert by its inertia the at least one second force.

Araki et al. teach wherein the clamping device comprises at least one mass which accelerates differently with respect to an acceleration of the support, each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force (Figure 22/23, where since the reticle 400 is not directly connected to the holder/clamp of this embodiment of Ataki et al. it would be evident that there could be slight differences in acceleration between the two parts).

Making the lithographic apparatus of Sato and Araki et al. further comprise the clamping device comprising at least one mass which accelerates differently with respect to an acceleration of the support,

each mass thereby capable of generating/negating a force that is transmissible for exerting the at least one second force would solve the problem of thermal overheating.

**Regarding Claims 14 and 37**, Sato teaches a lithographic apparatus/method according to claim 1/24.

He fails to teach wherein the clamping device is arranged to abut the support.

Ataki et al. teach wherein the clamping device is arranged to abut the support (Figure 15, where 282 a and 280 share a common boundary).

Arranging the clamping device arranged to abut the support would solve the problem of saving space.

It would have been obvious to modify the invention of Sato in the manner of Ataki et al. to have the clamping device abut the support since this would save space. Modification would yield the predictable result of having the same clamping device taking up less space.

**Regarding Claims 15 and 38**, Sato teaches the lithographic apparatus/method according to claim 1/24.

He fails to explicitly state wherein the lithographic apparatus is provided with a handler for handling the patterning device with respect to the support, wherein the handler is also arranged to handle the clamping device.

Araki et al. teach wherein the lithographic apparatus is provided with a handler for handling the patterning device with respect to the support, wherein the handler is also arranged to handle the clamping device (correction unit 550, [0204]).

Attaching a handler for handling the pattering device and the clamping device would solve the problem of how to control these pieces before, during, or after the patterning process.

It would have been obvious to one of ordinary skill in the art to utilize a way to handle both the patterning device and the clamping device through a control system or computation unit since this allows more control over the patterning process, and in the case of Ataki et al., allows quick correction for any detected reticle movement. Modification would have yielded the predictable results of allowing more control and shorter error response time.

Claims 13 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato and Lemelson as applied to claims 1 and 24 above, and further in view of Meinel et al. (USPN 4795518).

**Regarding Claims 13 and 36**, Sato teaches a lithographic apparatus/method according to claim 1.

He fails to explicitly state wherein the clamping device is arranged to provide additional contact area for enhancing the frictional forces needed to overcome to cause acceleration of the patterning device relative to the support when the support is accelerated.

Meinel et al. teach wherein the clamping device is arranged to provide additional contact area for enhancing the frictional forces needed to overcome to cause acceleration of the patterning device relative to the support when the support is accelerated ("the compression increases the contact area between the O ring and the package substrate," abstract).

Increasing the contact space between the lithographic apparatus and reticle would allow more frictional forces to hold the reticle and solve the problem of a sliding reticle.

It would have been obvious to use some sort of elastic O ring to modify the apparatus of Sato so that the more pressure between the reticle and the reticle holder there would have been, the more surface area would have been available to create a surface with friction to prevent the reticle from sliding during movement, since Meinel et al. do the same "to prevent lateral movement of the package substrate relative to the O ring," (abstract) analogous to the problem being solved in Sato's invention ([0003]).

Claims 7, 9 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato and Lemelson as applied to claims 1 and 24 above, and further in view of Hirayanagi (5847813).

**Regarding Claim 7,** Sato and Lemelson teach the apparatus according to claim 1.

They fail to teach wherein the clamping device is removable.

Hirayanagi teaches a clamping device releasably attached to the support (Figure 6b, "the clamps 45 can be secured to the lower portion 40b by e.g. thumbscrews or other appropriate fasteners as required" thumbscrews can be unscrewed to attach and detach the clamps).

Modification would have entailed using a pins or screws to attach the clamping device to the support in the apparatus of Sato, both of which can be removed/unscrewed and are there releasably attached.

It would have been obvious to make such a modification in order to assemble the apparatus in the first place, otherwise the parts would have fallen off.

**Regarding Claims 9 and 32**, Sato, Lemelson and Hirayanagi/Sato and Lemelson teach a lithographic apparatus according to claim 7/30, wherein the clamping device is passively connectable to the support (screw of Hirayanagi).

Claims 8 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato, Lemelson and Hirayanagi/ Sato and Lemelson as applied to claims 7 and 30 above, and further in view of Meinel et al. (USPN 4795518).

Regarding Claims 8 and 31, Sato, Lemelson and Hirayanagi teach the lithographic apparatus of Claims 7 and 30.

They fail to explicitly state whether said method involves actively connecting the clamping device to the support.

Meinel teaches actively connecting two things (vacuum suction tubes as a clamping element, Figure 1a/b).

It would have been obvious to use an actively connection between the clamp and the support since active connections are known in the art (as taught by Meinel's vacuum tubes). The clamping elements comprising an active clamping means via vacuum suction tubes and would solve the problem of easily and securely attaching and detaching the clamp from the support. Substituting an active support for a passive support would have allowed more control over removal of the clamp or moving of the clamp, and would have yielded predictable results of providing stable support for the clamping device. Additionally, active support would have allowed a better backup system and perhaps more knowledge prior to failure, which could be harder if there was a passive support (such as a screw, which could come loose without the knowledge of the technician, as opposed to a vacuum type support, upon imminent loss of which, the control system could notify the technician).

Claim 16-18, 20-23, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Hirayanagi (5847813).

**Regarding Claim 16**, Sato teaches a support constructed to support a patterning device which is capable of imparting a radiation beam with a pattern in its cross-section to form a patterned radiation beam (Figure 1); wherein the support is arranged to subject, at least when the support is accelerated, a first side of the patterning device to a clamping force (Figure 2) , and wherein the support is associated with a clamping device which is arranged to subject a second side of the patterning device (Figure 2, part 63, on either side), extending in a plane that is non-coinciding with the first side, to an additional clamping force, at least when the support is accelerated (Figure 2, part 63 clamper, on either side).

Sato fails to explicitly teach wherein the clamping device is releasably attached to the support.

Hirayanagi teaches a clamping device releasably attached to the support (Figure 6b, "the clamps 45 can be secured to the lower portion 40b by e.g. thumbscrews or other appropriate fasteners as required" thumbscrews can be unscrewed to attach and detach the clamps).

Modification would have entailed using a pins or screws to attach the clamping device to the support in the apparatus of Sato, both of which can be removed/unscrewed and are there releasably attached.

It would have been obvious to make such a modification in order to assemble the apparatus in the first place, otherwise the parts would have fallen off.

**Regarding Claim 17**, Sato and Hirayanagi teach a support according to claim 16, Sato further teaches wherein the first and second side of the patterning device are situated substantially opposite each other (see Figure 2).

**Regarding Claim 18**, Sato and Hirayanagi teach a support according to claim 16. Sato further teaches wherein the clamping device is connected to said support by clamping elements (thumbscrews).

**Regarding Claim 20**, Sato and Hirayanagi teach a support according to claim 19, wherein the clamping device is shaped to be connected to said support by clamp fitting (Sato, Figure 3a, 4 has a substantially flat surface, 66 is shown to have a substantially flat bottom).

**Regarding Claim 21,** Sato and Hirayanagi teach a support according to claim 16, Sato further teaches wherein said clamping device comprises a resilient structure for providing said additional clamping force by push pressure (Figure 4, spring 72).

**Regarding Claim 22**, Sato and Hirayanagi teach a support according to claim 16, Sato further teaches wherein said clamping device comprises a pivoting lever assembly (Figure 3), said lever assembly being pivotable around a pivot (part 62) that is in fixed positional relationship to said support (part 4) and comprising a lever part (part 63) contacting said patterning means so as to provide an additional clamping pressure on said patterning means while being pivoted (Figure 3a, arm is pivoted onto patterning means to provide an additional clamping pressure), and an actuator arranged to pivot said pivoting lever assembly (part 66, motor, discussed in [0027]).

**Regarding Claim 23**, Sato and Hirayanagi teach a support according to claim 16, Sato further teaches wherein said clamping device comprises a pivoting lever assembly (Figure 3), said assembly being pivotable around a pivot (Figure 3, part 62) that is in fixed positional relationship to said support (part 4) and comprising a lever part (part 63) contacting said patterning means so as to provide an additional clamping pressure on said patterning means while being pivoted wherein the assembly comprises an inertial mass element, fixedly connected to the pivoting assembly so as to pivot the assembly during accelerations (Figure 3a, part 65).

**Regarding Claim 39**, Sato et al. teach method comprising: supporting a patterning device using a support (Figure 3a, part 4); accelerating the support (Figure 1, part RR) subjecting a first side of the patterning device to at least one first force normal to the direction of the acceleration so that an acceleration of the patterning device with respect to the support is suppressed by frictional forces occurring at a contact area between the patterning device and the support (Figure 3a); and subjecting a second side of the patterning device to at least one second force normal to the direction of the acceleration of the support, at least when the support is accelerated (Figure 3a).

Sato fails to explicitly teach wherein the clamping device is releasably attached to the support.

Hirayanagi teaches a clamping device releasably attached to the support (Figure 6b, "the clamps 45 can be secured to the lower portion 40b by e.g. thumbscrews or other appropriate fasteners as required" thumbscrews can be unscrewed to attach and detach the clamps).

Modification would have entailed using a pins or screws to attach the clamping device to the support in the apparatus of Sato, both of which can be removed/unscrewed and are there releasably attached.

It would have been obvious to make such a modification in order to assemble the apparatus in the first place, otherwise the parts would have fallen off.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato and Hirayanagi as applied to claim 16 above and further in view of Meinel et al. (USPN 4795518).

**Regarding Claim 19,** Sato, Yuan and Laganza and Guarino teach a support according to claim 18.

Sato teaches where the reticle actively connects to the support via vacuum suction tubes (Figure 2, 30).

He fails to explicitly state whether said clamping elements comprise vacuum suction tubes.

Meinel teaches vacuum suction tubes as a clamping element (Figure 1a/b).

It would have been obvious to use an actively connection between the clamp and the support since active connections are known in the art (as taught by Meinel's vacuum tubes). The clamping elements comprising an active clamping means via vacuum suction tubes and would solve the problem of easily and securely attaching and detaching the clamp from the support. Substituting an active support for a passive support would have allowed more control over removal of the clamp or moving of the clamp, and would have yielded predictable results of providing stable support for the clamping device. Additionally, active support would have allowed a better backup system and perhaps more knowledge prior to failure, which could be harder if there was a passive support (such as a screw, which could come loose without the knowledge of the technician, as opposed to a vacuum type support, upon imminent loss of which, the control system could notify the technician).

***Response to Arguments***

Applicant's arguments filed 8/13/2009 have been considered but are moot in view of the new ground(s) of rejection.

"Releasably attached" is given its broadest reasonable interpretation in the above rejection.

Applicant states that because the arm of Sato is rotated out of the path of the reticle means that the reticle stage will not need to be changed/moved with a removable clamp (page 11).

1. It would still be useful to have a backup system, wherein, if the arm fails to rotate for any reason, the clamp device can be removed with minimal effort in order to gain access.

2. Detaching and reattaching the clamp could allow an operator to clean any buildup in the apparatus or on the mask stage that could be transferred onto the mask and impede the lithography process.

Applicants argument of releasably attaching: Hirayanagi, using a thumbscrew to attach the clamping device to the support, implicitly disclosing an ability to remove the clamping device, without an enormous amount of force, by unscrewing the thumbscrew. Additionally, Hirayanagi's statement that other attachment means as deemed necessary could be used supports motivation to combine behind rejection of claims 8 and 31 above.

Lemelson as cited above is simply used to show automation in the art. Furthermore, the prior art (i.e. Sato) discloses the claimed invention except for this feature. It would have been obvious to one having ordinary skill in the art t the time the invention was made to make this exertion of force automatic, since it has been held that broadly providing a mechanical or automatic means to replace manual activity which as accomplished the same result involves only routine skill in the art. In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958) (Appellant argued that claims to a permanent mold casting apparatus for molding trunk pistons were allowable over the prior art because the claimed invention combined "old permanent-mold structures together with a timer and solenoid which automatically actuates the known pressure valve system to release the inner core after a predetermined time has elapsed." The court held that broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art.). MPEP 2144.04

Lastly, In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961): The claimed structure, a lipstick holder with a removable cap, was fully met by the prior art except that in the prior art the cap is "press fitted" and therefore not manually removable. The court held that "if it were considered desirable for any reason to obtain access to the end of [the prior art's] holder to which the cap is applied, it would be obvious to make the cap removable for that purpose.". Some of the reasons to make the clamping device removably attached to the support are outlined above.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: USPN 7006202.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brooke Purinton whose telephone number is 571.270.5384. The examiner can normally be reached on Monday - Friday 7h30-5h00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571.272.2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brooke Purinton
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/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881